

AMENDMENTS TO THE SPECIFICATION:

Page 1, please add the following new paragraphs before paragraph [0001]:

[0000.2] **CROSS-REFERENCE TO RELATED APPLICATIONS**

[0000.4] This application is a 35 USC 371 application of PCT/DE 03/04134 filed on December 16, 2003.

[0000.6] **BACKGROUND OF THE INVENTION**

Please replace paragraph [0001] with the following amended paragraph:

[0001] **Prior Art** Field of the Invention

Please replace paragraph [0002] with the following amended paragraph:

[0002] The invention is ~~based on a~~ directed to an improved high-pressure pump for a fuel injection system of an internal combustion engine ~~as generically defined by the preamble to claim 1.~~

Please add the following new paragraph after paragraph [0002]:

[0002.5] **Description of the Prior Art**

Please replace paragraph [0003] with the following amended paragraph:

[0003] One ~~such~~ high-pressure pump is of the type with which this invention is concerned, known from German Patent Disclosure DE 198 48 035 A1. ~~This high-pressure pump~~ has a housing, ~~located~~ in which is located at least one pump element which has a pump piston that is driven in a reciprocating motion, via a transmission element in the form of a polygonal ring, by a drive shaft rotatably supported in the housing. The drive shaft has an eccentric portion, on which the transmission element is rotatably supported via a bearing bush. The drive shaft is supported in the housing via two bearing points, each with one bearing bush. Lubrication of the bearing point of the transmission element on the eccentric portion of the drive shaft and of the bearing points of the drive shaft in the housing is effected by means of

the fuel present in the interior of the housing. If fuel is pumped at very high pressure by the high-pressure pump, correspondingly heavy loads are put particularly on the bearing point of the transmission element and on the bearing points of the drive shaft, so that lubrication by the fuel present in the interior of the housing is no longer sufficient, and the bearing points exhibit heavy wear.

Please replace paragraph [0004] with the following amended paragraph:

[0004] Advantages of the Invention

SUMMARY AND ADVANTAGES OF THE INVENTION

Please replace paragraph [0005] with the following amended paragraph:

[0005] The high-pressure pump according to the invention ~~as defined by the characteristics of claim 1~~ has the advantage over the prior art that the lubrication of at least the bearing point of the transmission element on the eccentric portion of the drive shaft is improved, at the cost of only little structural complexity, so that fuel can be pumped at very high pressure by the high-pressure pump with little wear to the bearing point.

Page 2, please replace paragraph [0006] with the following amended paragraph:

[0006] ~~In the dependent claims, advantageous~~ Advantageous refinements and features of the high-pressure pump of the invention are disclosed. By means of ~~the one~~ embodiment **according to claim 3**, the lubrication of the at least one bearing point of the drive shaft is also improved. ~~The embodiment in accordance with claims 4 and 5~~ Another feature makes a further-improved lubrication of the bearing point possible by means of improved distribution of the fuel at the bearing point. ~~The embodiment in accordance with claim 6 makes simple~~ Simple manufacture of the conduit system in the drive shaft ~~is~~ possible. ~~The~~

~~embodiment in accordance with claims 7 and 8~~ One feature makes it simple to deliver fuel into the conduit system of the drive shaft, through a bearing point of the drive shaft.

Please replace paragraph [0007] with the following amended paragraph:

[0007] **Drawing** BRIEF DESCRIPTION OF THE DRAWINGS

Please replace paragraph [0008] with the following amended paragraph:

[0008] ~~One exemplary embodiment of the invention shown in the drawing and explained in further detail in the ensuing description. Fig. 1 shows a fuel injection system of an internal combustion engine having a high-pressure pump; Fig. 2 shows the high-pressure pump in a longitudinal section on a larger scale; Fig. 3 shows a detail, marked III in Fig. 2, with a bearing point of the high-pressure pump on a larger scale; and Fig. 4 shows a detail, marked IV in Fig. 2, with a bearing point of the high-pressure pump on a larger scale. The invention will be more fully described herein below, with reference to the drawings, in which:~~

Please add the following new paragraph after paragraph [0008]:

[0008.2] Fig. 1 schematically shows a fuel injection system of an internal combustion engine having a high-pressure pump;

Please add the following new paragraph after paragraph [0008.2]:

[0008.4] Fig. 2 shows the high-pressure pump in a longitudinal section on a larger scale;

Please add the following new paragraph after paragraph [0008.4]:

[0008.6] Fig. 3 shows a detail, marked III in Fig. 2, with a bearing point of the high-pressure pump on a larger scale; and

Please add the following new paragraph after paragraph [0008.6]:

[0008.8] Fig. 4 shows a detail, marked IV in Fig. 2, with a bearing point of the high-pressure pump on a larger scale.

Please replace paragraph [0009] with the following amended paragraph:

[0009] Description of the Exemplary Embodiment

DESCRIPTION OF THE PREFERRED EMBODIMENT

Page 4, please replace paragraph [0013] with the following amended paragraph:

[0013] The pump piston 34 is kept with its piston base 50 in contact with the transmission element 28 by means of a prestressed spring 48. Upon the rotary motion of the drive shaft 12, the transmission element 28 ~~is does not move~~ rotate with the drive shaft, but because of the eccentric portion 26, it executes a motion perpendicular to the pivot axis 13 of the drive shaft 12, which brings about the reciprocating motion of the pump piston 34. In the intake stroke of the pump piston 34, in which the pump piston moves radially inward, the pump work chamber 38 is filled with fuel through the fuel inlet conduit 40 while the inlet valve 42 is open and the outlet valve 46 is closed. In the pumping stroke of the pump piston 34, in which the pump piston moves radially outward, fuel is pumped at high pressure by the pump piston 34 through the fuel outlet conduit 44 to the reservoir 110, with the outlet valve 46 open and the inlet valve 42 closed.

Please replace paragraph [0014] with the following amended paragraph:

[0014] The lubrication connection 170, originating at the feed pump 140, extends in the housing 10 in a conduit 52 that discharges at the outer jacket of the drive shaft 12. In the drive shaft 12, a conduit system is embodied, into which the conduit 52 discharges and through which fuel is carried under pressure to the bearing point 30 of the transmission element 28 on the eccentric portion 26 of the drive shaft 12, where the fuel emerges from the conduit system and lubricates the bearing point 30. The conduit system in the drive shaft 12 has a first conduit portion 54, which extends for instance at least approximately radially to the

pivot axis 13 of the drive shaft 12 and is embodied as a bore, made from the outer jacket of the drive shaft 12 into the drive shaft and extending approximately to the middle of the drive shaft 12. The first conduit portion 54 discharges at the outer jacket of the drive shaft 12 in a plane in which the outlet orifice of the conduit 52 in the housing 10 is also located. The first conduit portion 54 is adjoined by a second conduit portion 55, which extends in the direction of the pivot axis 13 of the drive shaft 12, for instance coaxially to the pivot axis 13. The second conduit portion 55 is embodied as a longitudinal bore, in particular in the form of a blind bore, made from one face end of the drive shaft 12 into the drive shaft. The second conduit portion 55 is closed, toward the face end of the drive shaft 12, by means of a closure element 56 inserted into the drive shaft. The second conduit portion 55 is adjoined by a third conduit portion 57, which extends for instance at least approximately radially to the pivot axis 13 of the drive shaft 12 and is embodied as a bore made into the drive shaft 12 from its outer jacket and which extends approximately to the middle of the drive shaft 12 and discharges into the second conduit portion 55. The third conduit portion 57 discharges at the outer jacket of the eccentric portion 26 of the drive shaft 12, preferably at least approximately in the middle of the bearing point 30 of the transmission element 28. Fuel pumped by the feed pump 140 travels via the lubrication connection 170, the conduit 52, and the conduit system 54, 55, 57 in the drive shaft 12 to reach the bearing point 30 of the transmission element 28 on the eccentric portion 26 of the drive shaft 12, where it emerges in order to lubricate ~~it~~ the bearing point.

Page 5, please replace paragraph [0015] with the following amended paragraph:
[0015] It may be provided that the transmission element 28 is supported directly on the eccentric portion 26. Alternatively, it may be provided that the transmission element 28 is

supported on the eccentric portion 26 via a bearing bush 58. The bearing bush 58 may be embodied in one piece, as shown in Fig. 3, or in two parts, as shown in Fig. 2. The In the embodiment of Fig. 2, bearing bush 58 is split into two parts, located side by side in the direction of the pivot axis 13 of the drive shaft 12, and between which parts there is a gap 59. The gap 59 is preferably located in a plane in which the third conduit portion 57 discharges at the outer jacket of the eccentric portion 26. The lubrication of the bearing point 30 is improved further by the split bearing bush 58, because the fuel emerging from the third conduit portion 57 can be distributed better in the bearing point 30.

Page 6, please replace paragraph [0016] with the following amended paragraph:

[0016] In addition to the bearing point 30 of the transmission element 28 on the eccentric portion 26, one or both bearing points 14, 16 of the drive shaft ~~30~~ 12 in the housing 10 can also be lubricated through the conduit system in the drive shaft 12. The second conduit portion 55 continues in the direction of the pivot axis 13 of the drive shaft 12 as far as the bearing point 16, where a fourth conduit portion 60 adjoins it. The fourth conduit portion 60 extends for instance at least approximately radially to the pivot axis 13 of the drive shaft 12 and is embodied as a bore that is made into the drive shaft 12 from its outer jacket and that extends approximately to the middle of the drive shaft 12 and discharges into the second conduit portion 55. The fourth conduit portion 60 discharges at the outer jacket of the drive shaft 12, preferably at least approximately in the middle of the bearing point 16 of the drive shaft 12. The bearing bush 24 of the bearing point 16 may be in one piece or, as described above for the bearing bush 58, in two parts, with a gap ~~25~~ between the parts.

Page 7, please add the following new paragraph after paragraph [0019]:

[0020] The foregoing relates to a preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.